

### REMARKS

Applicants have amended claims 23, 28, 39, 44, 46 to more particularly point out and distinctly claim the subject matter which Applicants regard as their invention, and cancelled non-elected claims 1-22 without prejudice. Applicants have also inserted the word "organic" in claim 45, support for which can be found at page 15, line 9 of the Specification. No new matter has been introduced by the amendments.

Claims 23-54 are currently pending. Reconsideration of the application, as amended, is respectfully requested in view of the remarks below.

#### Rejection under 35 U.S.C. § 112, second paragraph

The Examiner rejected claims 23-27, 36-38, 40-43, 45-50, and 52-54 as being indefinite. According to the Examiner, "[t]he phrase 'nitrogen based tetradentate [or hexadentate] ligand' is unclear. It appears that N must be present, but in what form? Does the N have to be present in a binding position, or just somewhere in the ligand? And if it must be in a binding position, do all these positions have to be N? That is, could there be a tetradentate ligand, in which, say two binding positions are N and two are O?" See the Office Action, page 2, lines 12-19.

Applicants would like to point out that a nitrogen-based tetradentate ligand refers to a ligand that is bonded to four transition metal atoms, and includes one or more heterocyclic or heteroaryl groups (e.g., triazine, pyrazole, imidazole, or pyridine) having one or more nitrogen atoms. See the Specification, page 7, lines 8-10. Referring to the six exemplary ligands on pages 7-9 of the Specification, it is clear that the nitrogen atoms have to be present in all four binding positions. In other words, a nitrogen-based tetradentate ligand does not include a ligand having two nitrogen atoms and two oxygen atoms in the binding positions. Nitrogen atoms can also be present in other non-coordinated positions in a ligand, see an exemplary ligand 5,10,15,20-tetra-pyridin-4-yl-porphyrine, whose chemical structure is shown on page 9 of the Specification. The definition of "nitrogen-based hexadentate ligand" is similar to that of "nitrogen-based tetradentate ligand."

The Examiner also rejected claims 28-29, 31-34, 39, and 44 as being indefinite on the following two grounds: (1) "[t]he term 'cyclyl' is not a standard term. What does it mean? If it

means any cycle, then why are the next three terms [heterocyclyl, aryl, and heteroaryl] present, as these are all cycles?" and (2) "the first three terms [of B] recited in claims 28, 39, and 44] are monovalent, but the variable [B] is tetravalent." See the Office Action, page 3, lines 11-16.

First, Applicants would like to point out that the term "cyclyl" at issue is well known to a skilled person in the organic chemistry art. See Loudon, Organic Chemistry, 3<sup>rd</sup> Ed, Benjamin/Cummings Publishing Company, Inc, 1995, pages 271 and 344, a copy of which is attached hereto as "Exhibit A." A cyclyl (more precisely, monocyclyl here) compound is a non-aromatic hydrocarbon compound containing a single ring (page 271 of Exhibit A). A heterocyclyl compound is a non-aromatic compound containing one or more ring having at least one ring heteroatom (e.g., N, O, or S) (page 344 of Exhibit A). As defined in the Specification, the term "aryl" refers to a hydrocarbon ring system having at least one aromatic ring, and the term "heteroaryl" refers to a hydrocarbon ring system having at least one aromatic ring which contains at least one heteroatom. See page 12, line 10 to page 13, line 1.

Second, the first three terms of B" recited in claims 28, 39, and 41 (i.e., alkyl, alkenyl, and alkynyl) are defined as substituted or unsubstituted, straight-chained or branched hydrocarbon moieties. See the Specification, page 12, lines 2-4. A skilled person in the organic chemistry art would know that these three terms include both monovalent moieties and multiple-valent moieties<sup>1</sup>.

For the reasons set forth above, Applicants request withdrawal of this indefiniteness rejection.

#### Rejection under 35 U.S.C. § 112, first paragraph

The Examiner rejected claims 23-29, 31-34, 36-50, and 52-54 as "containing subject matter which was not described in the specification in such a way as to enable one skilled in the art ... to make and/or use the invention." See the Office Action, page 2, lines 20-23. In particular, the Examiner pointed out that "[e]nablement cannot be seen for the scope of Z and T" on the ground that "[t]he actual ... tetragonal supramolecules have some significant separation

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<sup>1</sup> Indeed, it is impossible and unnecessary to list all alkyl, alkenyl, and alkynyl moieties having different valences. For example, as alkyl, alkenyl, and alkynyl each can have as many as four valences, one would need 12 terms to describe them. However, these terms are either not available or not commonly used.

between the N atoms of the polydentate ligands. ... But the claims do not require this in a ligand.”

Applicants would like to bring to the Examiner's attention that it is not necessary to disclose each ligand assigned to Z and T. The law does not impose such a formidable burden on inventors seeking patent protection. “Appellants (here, Applicants) are not required to disclose every species encompassed by their claims even in an unpredictable art” (emphasis original). *In re Angstadt*, 190 USPQ 214, 218 (CCPA 1976). Such a holding is only reasonable, since it is very difficult, if not impossible, to test and disclose all operative species in the chemical and biotechnology fields. Indeed, as pointed out by the *Angstadt* court “[w]ithout undue experimentation or effort or expense the combinations which do not work will readily be discovered and, of course, nobody will use them and the claims do not cover them.” *Id.*, at 219. Here, the Specification only discloses tetragonal supramolecules having ligands with “significant separation between the nitrogen atoms.” However, ligands without this characteristic and do not work (i.e., cannot form a complex with four metal atoms) can be readily discovered by the experimental procedures described in the Specification, and the claims at issue do not cover supramolecules containing such ligands. In other words, following the *Angstadt* holding, both variables Z and T are adequately enabled by the Specification.

The Examiner further pointed out that “[t]here is no possible way that four metals could possibly fit around [tetrazine recited in claim 28].” See the Office Action, page 2, line 24 to page 3, line 4. Applicants have removed from claims 28, 39, and 44 “tetrazine” as a value assigned to Z.

The Examiner rejected claims 23-24, 26-31, 33-36, 38-40, 42-47, 49-52, and 54 on the ground that “the specification, while being enabling for other choices, does not reasonably provide enablement for m=5.” See the Office Action, page 3, lines 5-7. Applicants have removed “5” as a value assigned to m from claims 23 and 46.

For the reasons set forth above, Applicants have met the enablement requirement with respect to how to make and/or use the invention of claims 23-54.

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CONCLUSION

Applicants submit that the grounds for rejection asserted by the Examiner have been overcome, and that claims 23-54, as pending, define subject matter that is definite and enabled. On this basis, it is submitted that all claims are now in condition for allowance, an action of which is requested.

Enclosed is a check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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